

COMP 567 Final Project Proposal

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Project Goal

The goal of this project is to evaluate the performance of different types of recurrent neural networks (vanilla RNN, GRU, LSTM etc.) on various prediction step windows.

Background/Details

Freezing of Gait (FOG) is characterized as a sudden halt with a feeling of “feet being glued to the ground” during gait in individuals with Parkinson’s disease (PD). These abrupt and transient episodes can lead to falls, injuries, and reduction of quality of life for individuals with PD. Deep learning, in particular RNNs, have shown promise in predicting onset of freezing of gait (FOG) [1].

Current techniques to manage FOG are typically used once an episode identified and in the process of occurring and therefore do not aim at prevention. With adequate prediction and lead-time, researchers can develop interventions to aim at preventing FOG from occurring. For our project, our goal is to look at some popular RNN variations and compare their performance in predicting FOG at various prediction step windows (1ms, 50ms, 100ms).

Approach

Our approach is to train models using various types of RNN (vanilla, LSTM, GRU) on an available freezing of gait time-series dataset [2]. We will then document the performance of each model as we use it to make different time-series predictions using different prediction step windows (1ms, 50ms, and 100ms).

Feasibility

This study is feasible given the time frame for the class project. The data is from an open-source repository and we have experience working with RNNs for our Assignment 2.